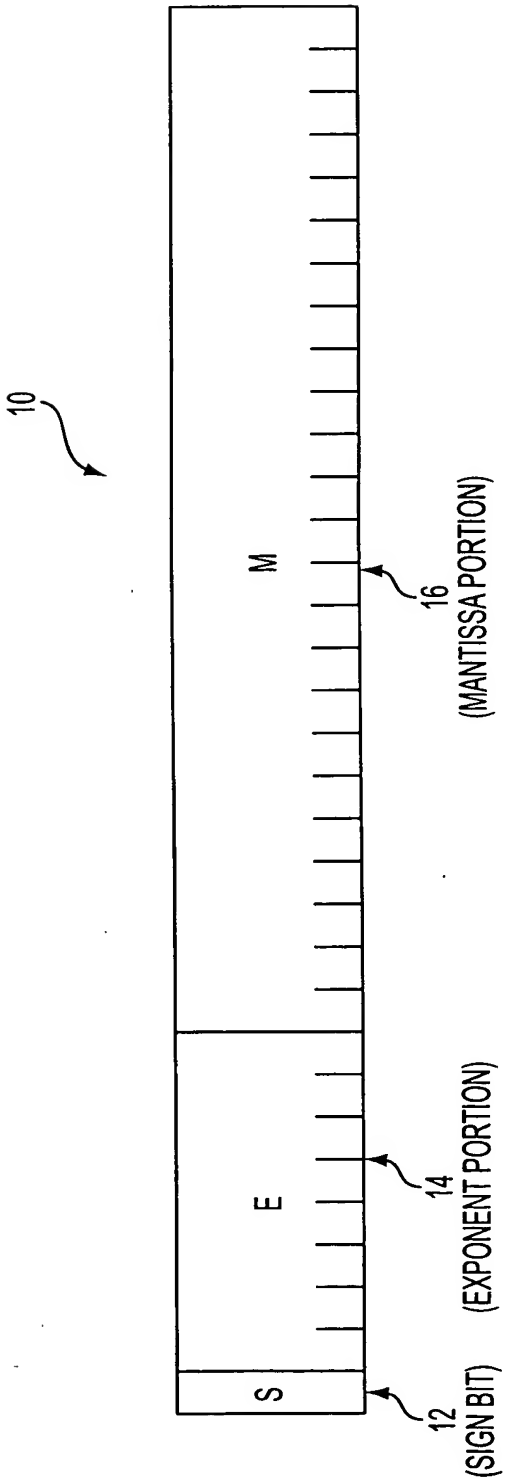

FIG. 1
(PRIOR ART)

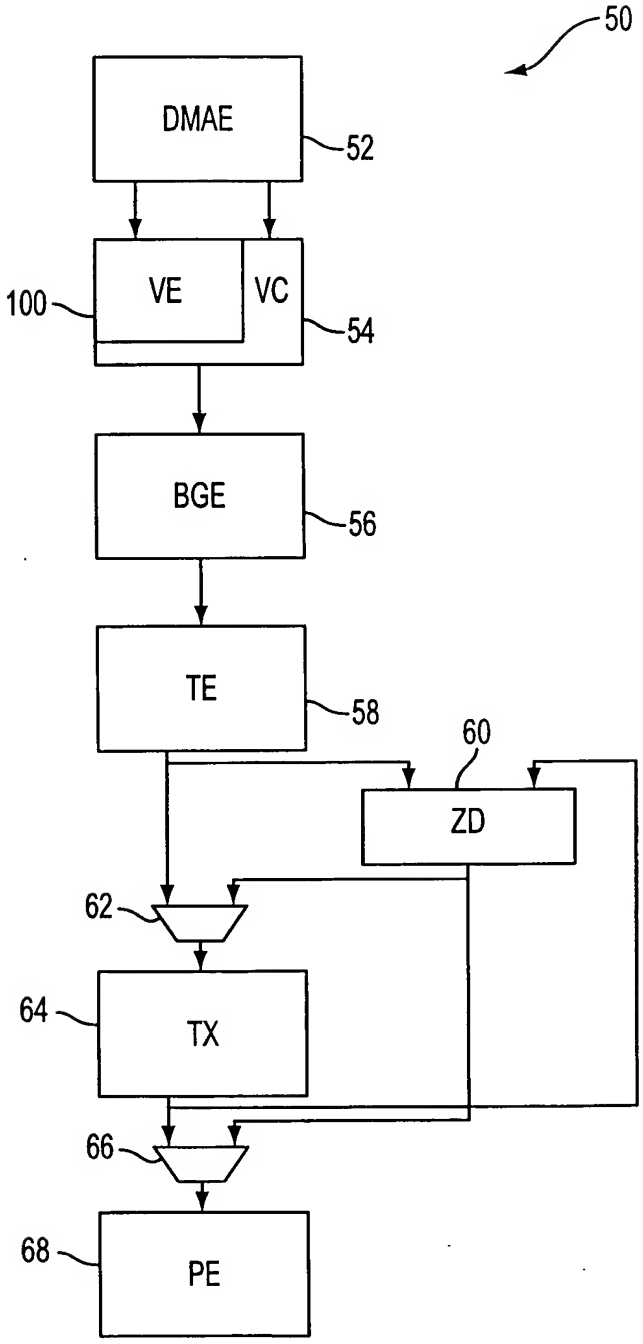

FIG. 2

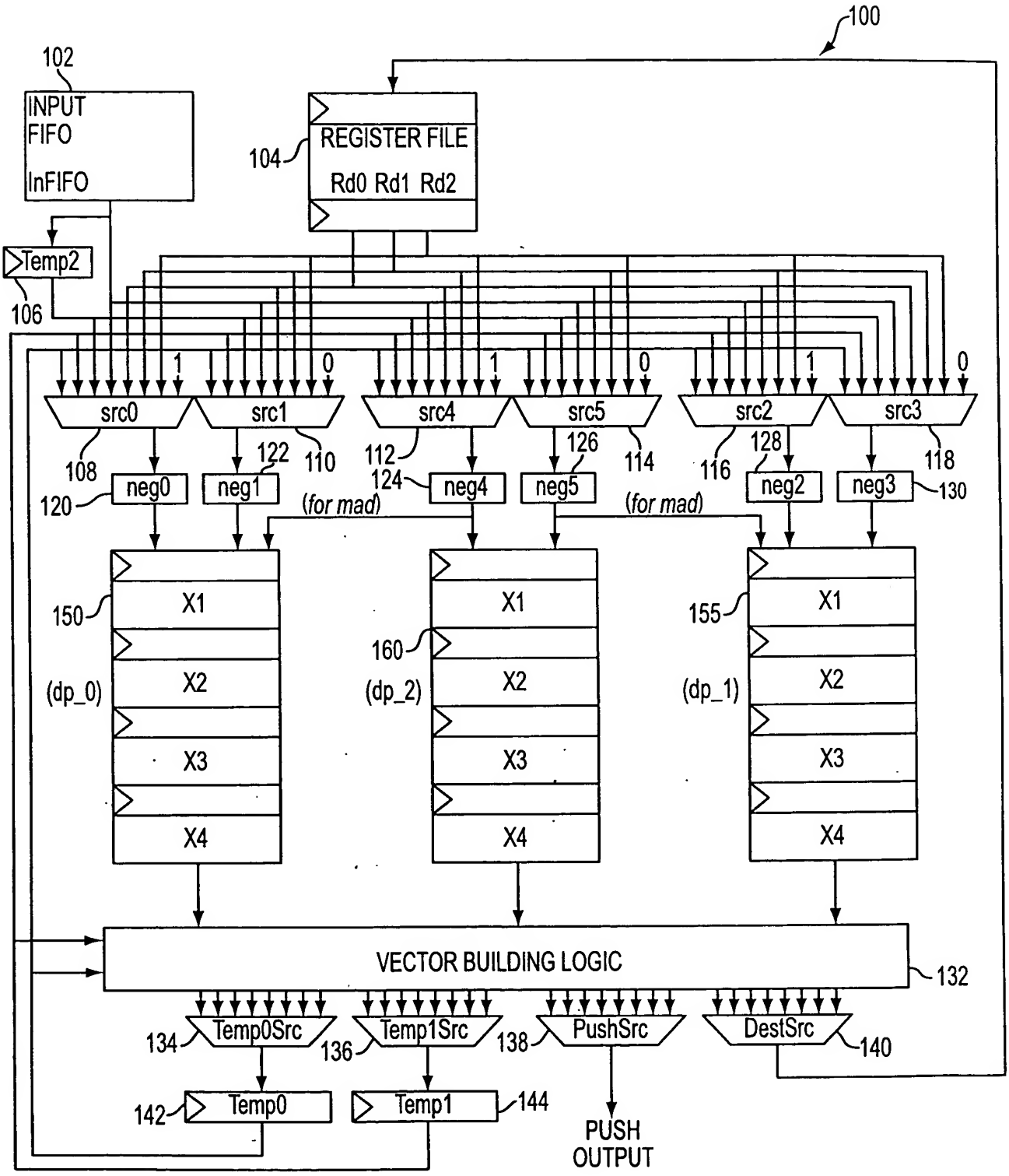
100
102
INPUT FIFO
InFIFO
104
REGISTER FILE
Rd0 Rd1 Rd2
Temp2
106
src0
src1
src4
src5
src2
src3
108
110
112
114
116
118
120
122
124
126
128
130
neg0
neg1
neg4
neg5
neg2
neg3
(for mad)
(for mad)
150
155
160
X1
X2
X3
X4
(dp_0)
(dp_2)
(dp_1)
VECTOR BUILDING LOGIC
132
Temp0Src
Temp1Src
PushSrc
DestSrc
134
136
138
140
Temp0
Temp1
142
144
PUSH OUTPUT

FIG. 3

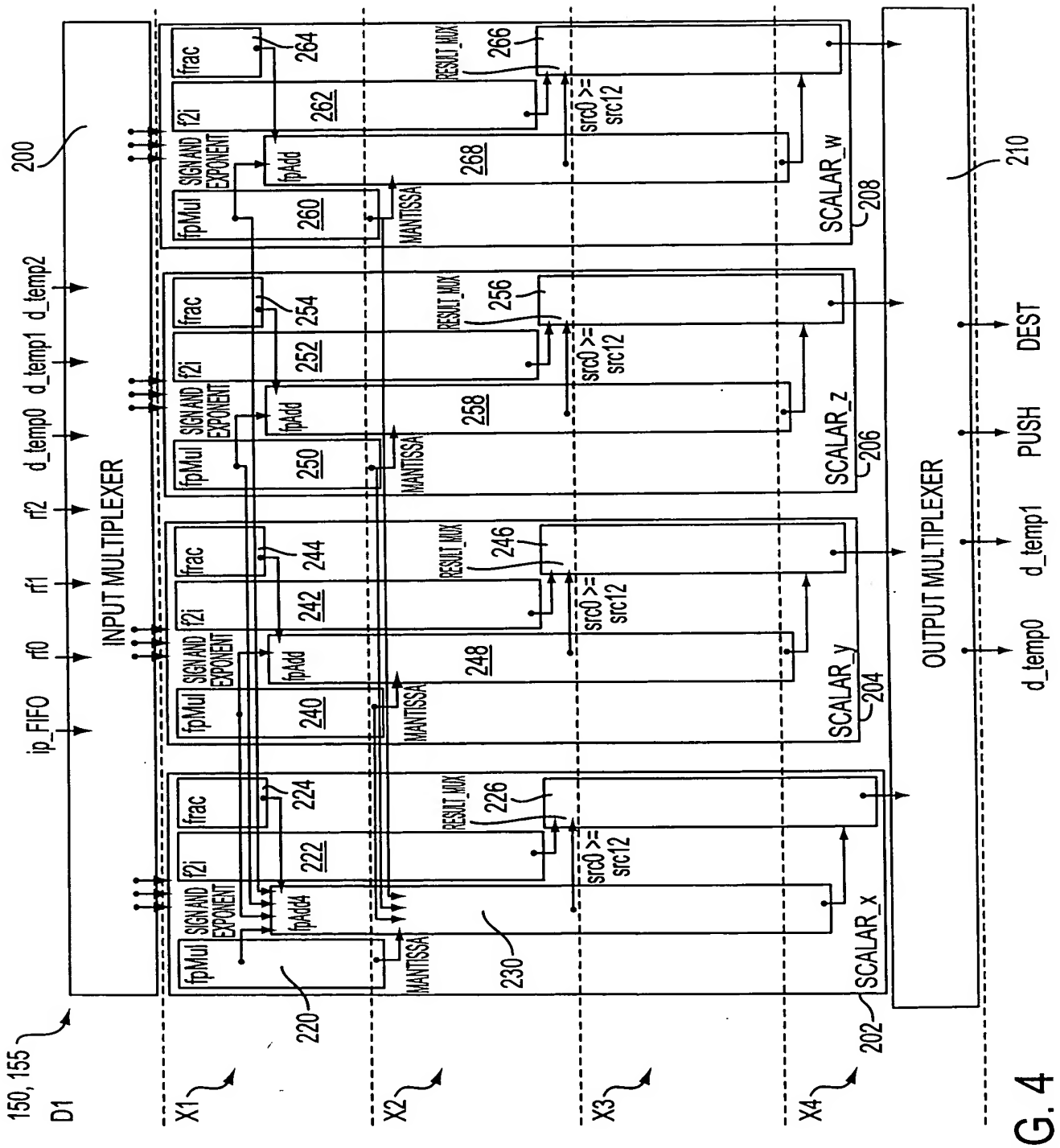
200
INPUT MULTIPLEXER
ip_FIFO
rf0
rf1
rf2
d_temp0
d_temp1
d_temp2
150, 155
D1
X1
X2
X3
X4
fpMul
SIGN AND EXPONENT
fpAdd
fpAdd4
f2i
frac
MANTISSA
RESULT_MUX
src0 >= src12
SCALAR_x
SCALAR_y
SCALAR_z
SCALAR_w
202
204
206
208
210
OUTPUT MULTIPLEXER
DEST
PUSH
d_temp0
d_temp1
220
222
224
226
230
240
242
244
246
248
250
252
254
256
258
260
262
264
266
268

FIG. 4

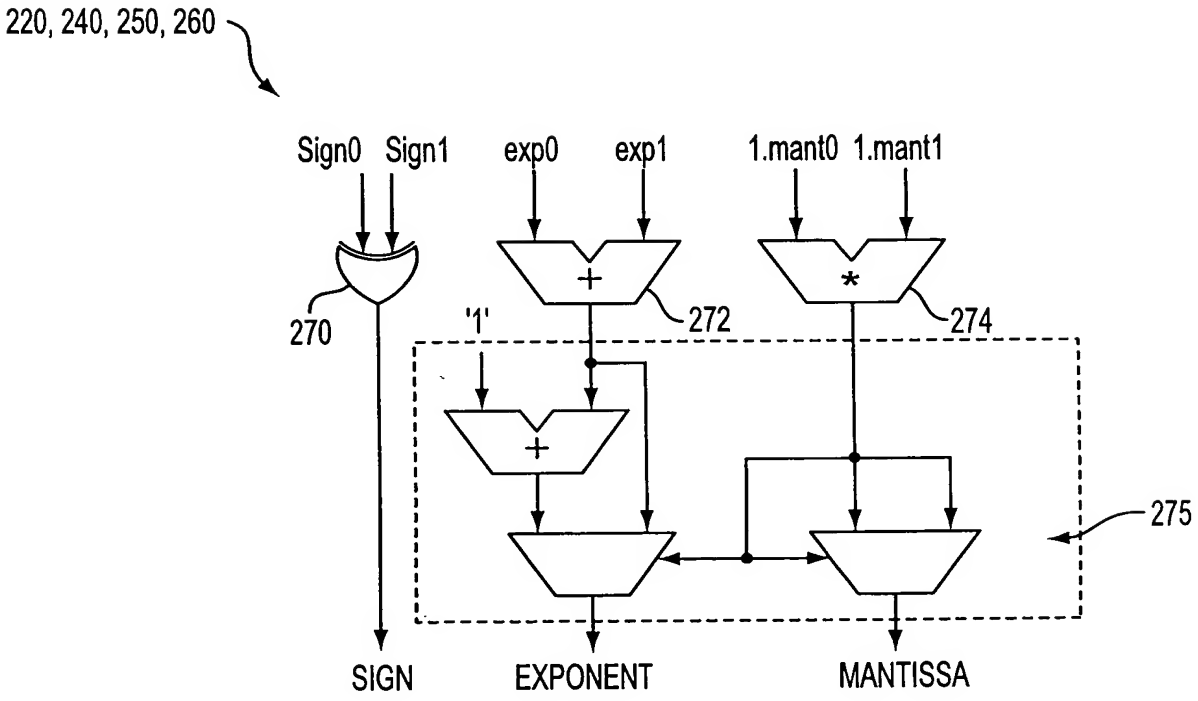
220, 240, 250, 260
Sign0
Sign1
exp0
exp1
1.mant0
1.mant1
270
'1'
272
274
275
SIGN
EXPONENT
MANTISSA

FIG. 5

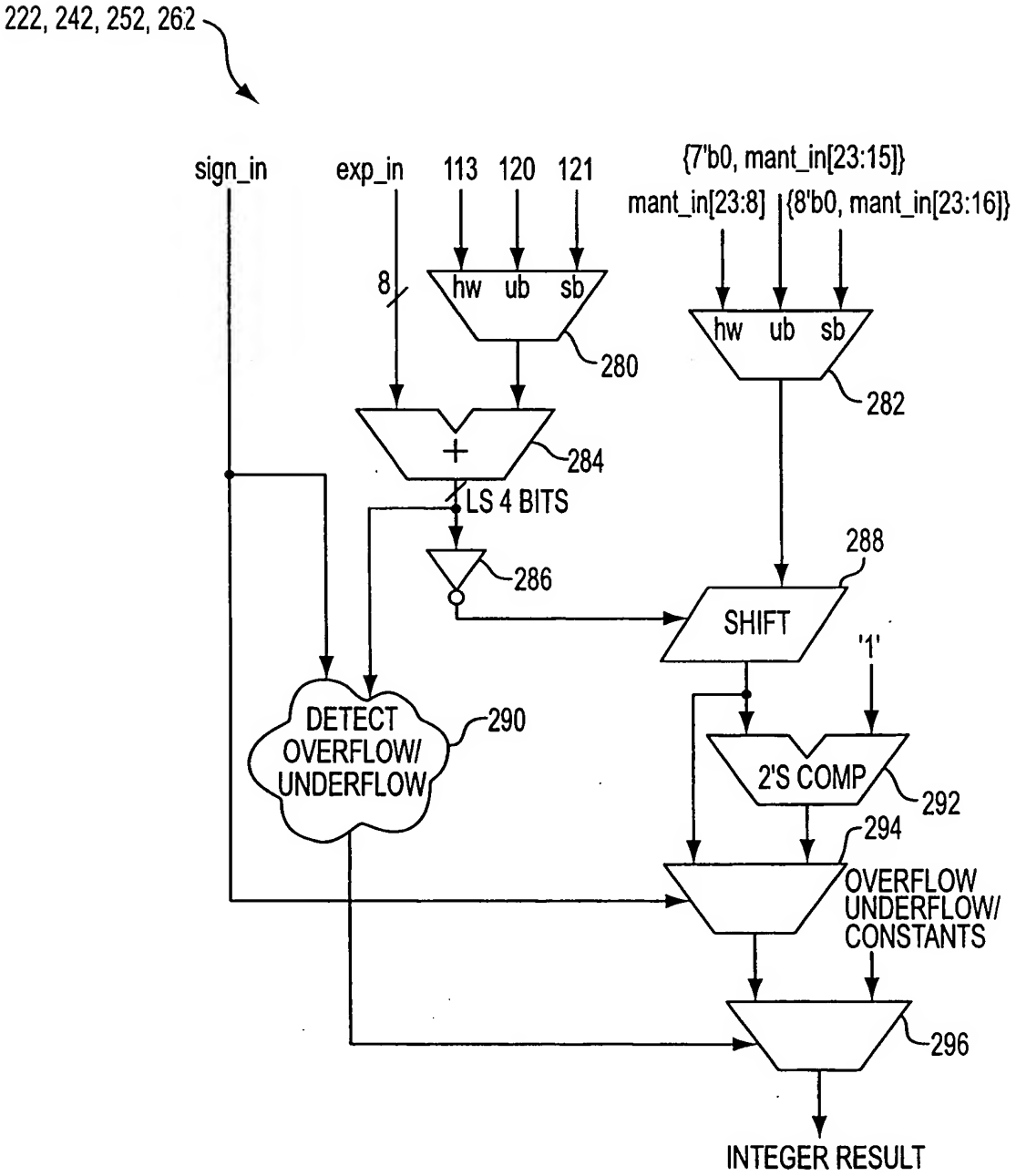
222, 242, 252, 262
sign_in
exp_in
113
120
121
{7'b0, mant_in[23:15]}
mant_in[23:8]
{8'b0, mant_in[23:16]}
8
hw ub sb
280
hw ub sb
282
+
284
LS 4 BITS
286
288
SHIFT
'1'
DETECT OVERFLOW/ UNDERFLOW
290
2'S COMP
292
294
OVERFLOW UNDERFLOW/ CONSTANTS
296
INTEGER RESULT

FIG. 6

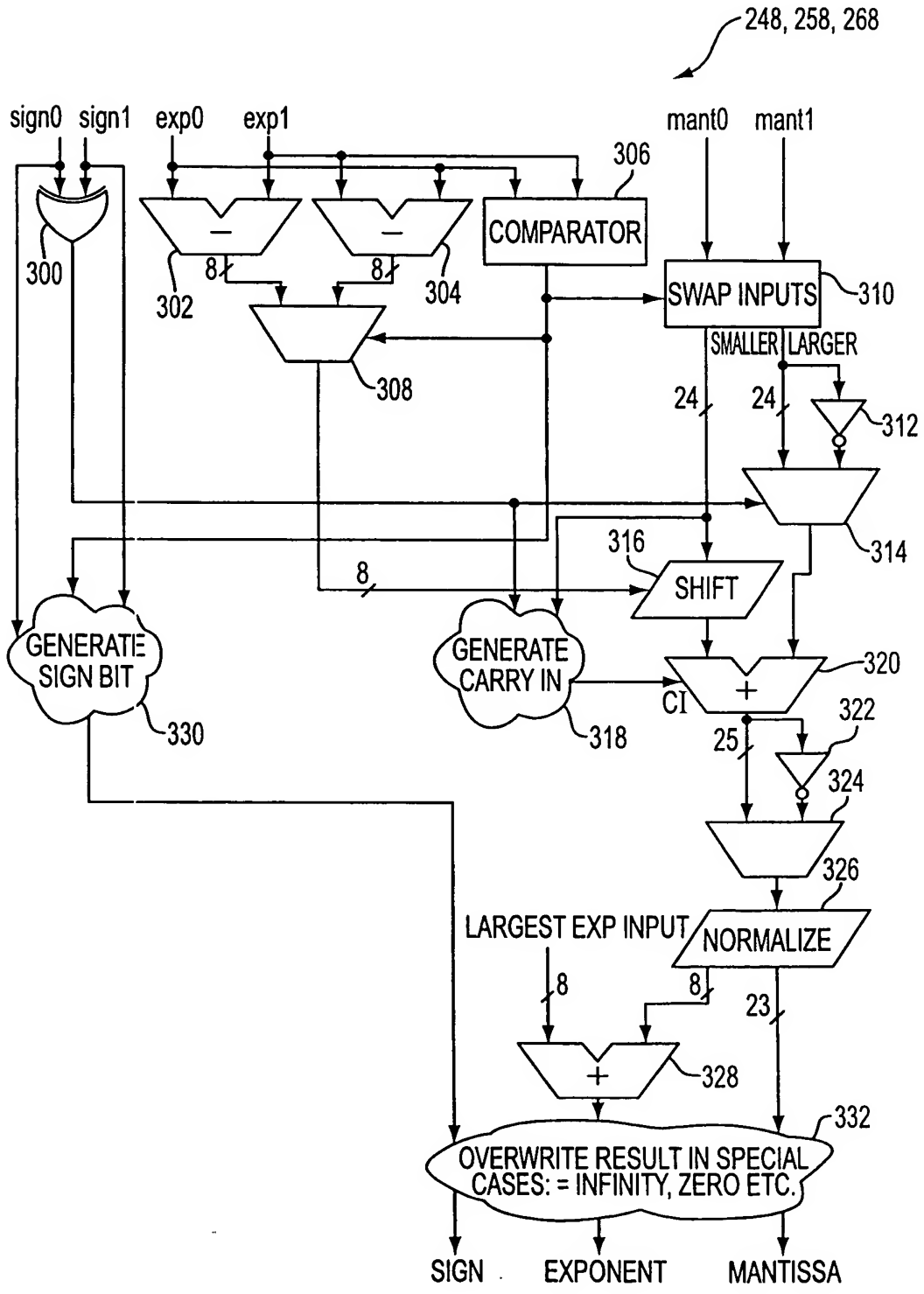
248, 258, 268
sign0
sign1
exp0
exp1
mant0
mant1
306
COMPARATOR
300
302
304
8
8
SWAP INPUTS
310
SMALLER
LARGER
308
24
24
312
314
316
SHIFT
8
GENERATE SIGN BIT
330
GENERATE CARRY IN
318
320
CI
322
25
324
326
LARGEST EXP INPUT
NORMALIZE
8
8
23
328
332
OVERWRITE RESULT IN SPECIAL CASES: = INFINITY, ZERO ETC.
SIGN
EXPONENT
MANTISSA

FIG. 7

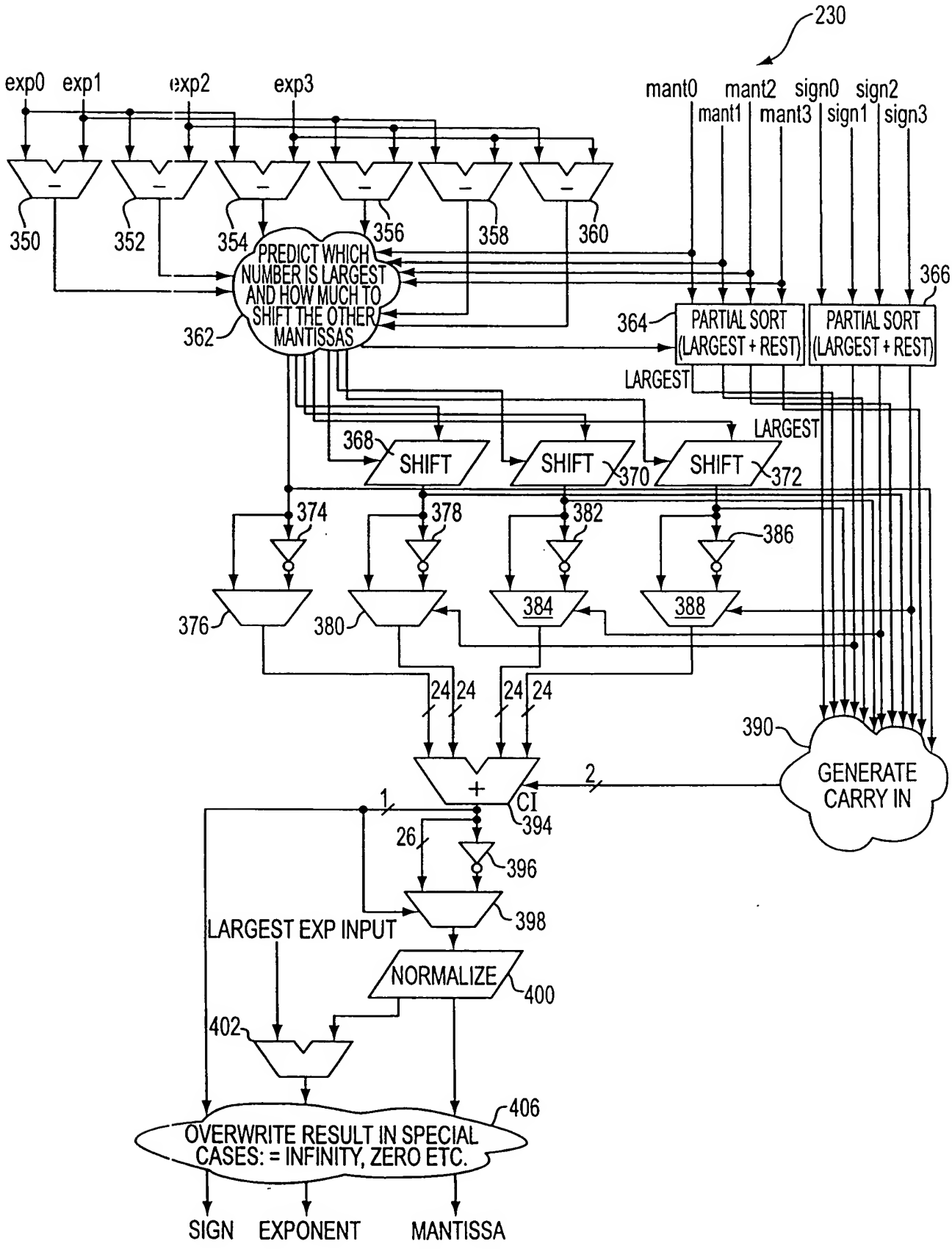
230
exp0
exp1
exp2
exp3
mant0
mant1
mant2
mant3
sign0
sign1
sign2
sign3
350
352
354
356
358
360
PREDICT WHICH NUMBER IS LARGEST AND HOW MUCH TO SHIFT THE OTHER MANTISSAS
362
366
364
PARTIAL SORT (LARGEST + REST)
PARTIAL SORT (LARGEST + REST)
LARGEST
LARGEST
368
SHIFT
SHIFT
370
SHIFT
372
374
378
382
386
376
380
384
388
24
24
24
24
390
GENERATE CARRY IN
2
+
CI
394
1
26
396
398
LARGEST EXP INPUT
NORMALIZE
400
402
406
OVERWRITE RESULT IN SPECIAL CASES: = INFINITY, ZERO ETC.
SIGN
EXPONENT
MANTISSA

FIG. 8

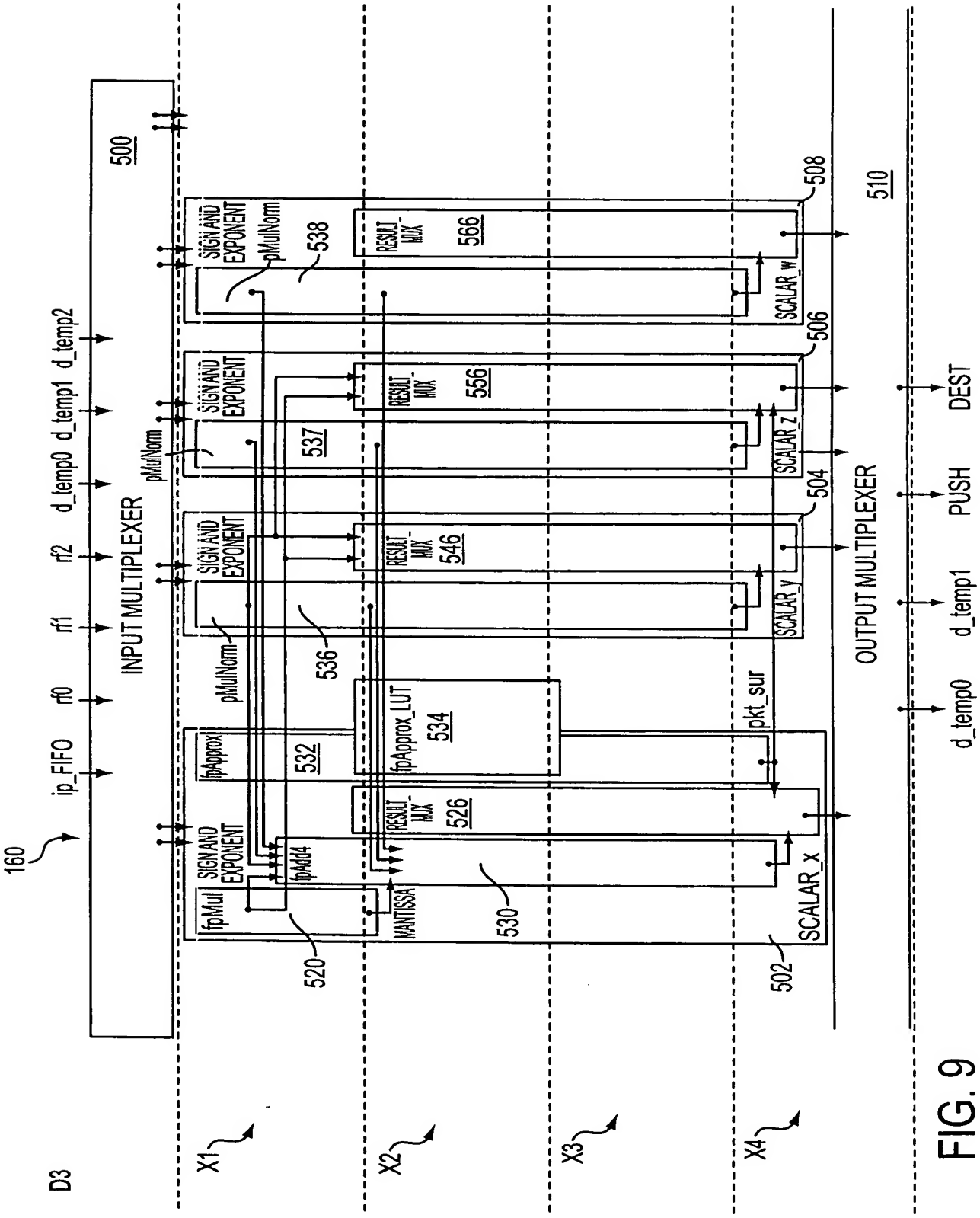
INPUT MULTIPLEXER
OUTPUT MULTIPLEXER
ip_FIFO
rf0
rf1
rf2
d_temp0
d_temp1
d_temp2
PUSH
DEST
SIGN AND EXPONENT
fpMul
fpAdd4
fpApprox
fpApprox_LUT
MANTISSA
RESULT_MUX
pMulNorm
SCALAR_x
SCALAR_y
SCALAR_z
SCALAR_w
pkt_sur
160
500
502
504
506
508
510
520
530
532
534
536
537
538
546
556
566
526
X1
X2
X3
X4
D3

FIG. 9

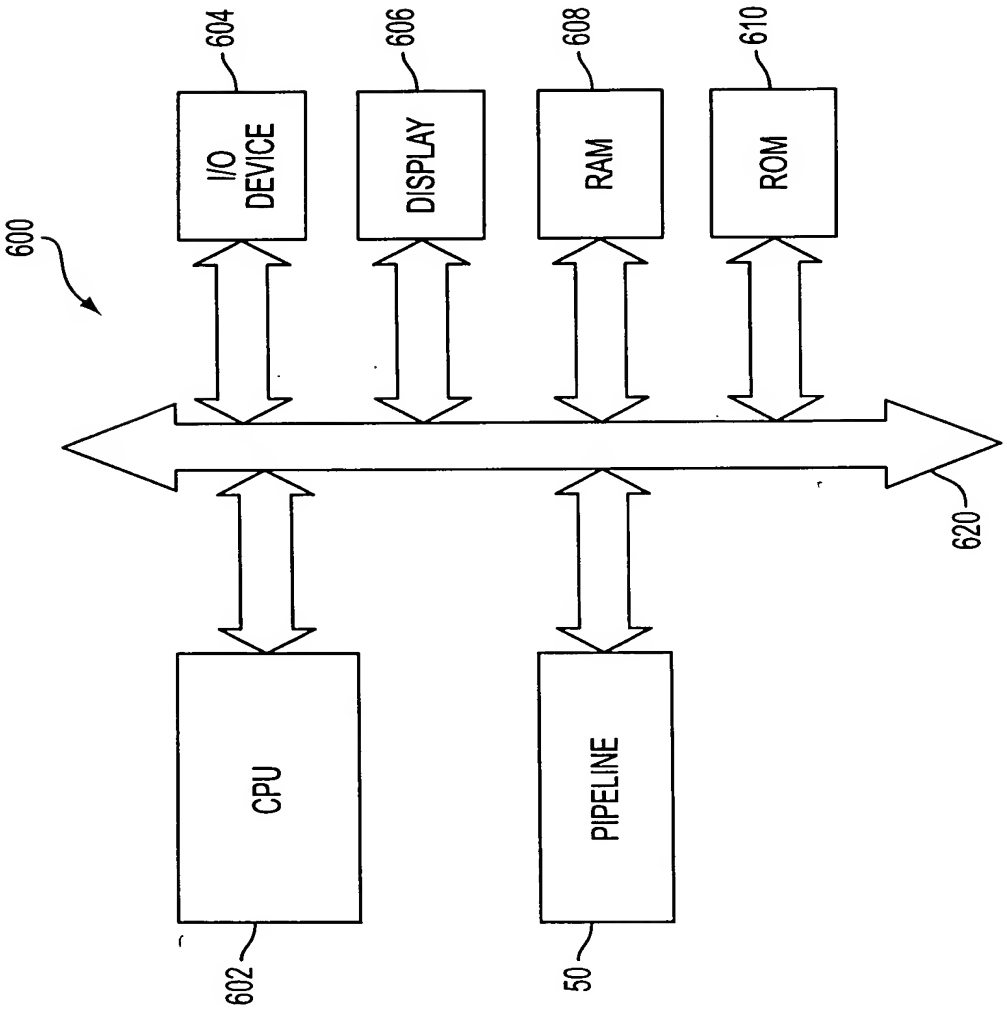
600
604
I/O DEVICE
606
DISPLAY
608
RAM
610
ROM
620
CPU
602
PIPELINE
50

FIG. 10